DOCKET NO.: GKN-0135 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Zi Li, et al. **Confirmation No.:**

Application No.: 10/624,616 **Group Art Unit: Not Yet Assigned**

Filing Date: July 21, 2003 **Examiner: Not Yet Assigned**

For: FILTERS WITH A GRADUATED STRUCTURE AND A METHOD FOR PRODUCING THE SAME

DATE OF DEPOSIT: Aug. 26, 2003

I HEREBY CERTIFY THAT THIS PAPER IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL, POSTAGE PREPAID, ON THE DATE INDICATED ABOVE AND IS ADDRESSED TO THE UNITED STATES PATENT AND TRADEMARK OFFICE, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450.

TYPED NAME: **Frank T. Carroll**
REGISTRATION NO.: **42,392**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).

☒ In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of

the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

☐ In accordance with § 1.129(a), this Information Disclosure Statement is being filed in connection with ☐ the first or ☐ second After Final Submission, therefore:

☐ Certification in Accordance with § 1.97(e) is attached; or

☐ The fee of **$180.00** as set forth in § 1.17(p) is attached.

☐ In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

☐ Certification in Accordance with § 1.97(e) is attached; or

☐ The fee of **$180.00** as set forth in § 1.17(p) is attached.

☐ In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of **$180.00** as set forth in § 1.17(p).

☒ Copies of each of the references listed on the attached Form PTO-1449 are enclosed herewith.

☐ Copies of references listed on the attached Form PTO-1449 are enclosed herewith

EXCEPT THAT:

☐ In view of the voluminous nature of references [list as appropriate], and the likelihood that these references are available to the Examiner, copies are not enclosed herewith.

☐ In accordance with § 1.98(d), copies of the following references listed on the attached Form PTO-1449 are not enclosed herewith because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application(s) for which a claim for priority under 35 U.S.C.§ 120 have been made in the instant application:

☐ Copies of references **[list as appropriate]** listed on the attached Form PTO-1449 were previously cited by or submitted to the Patent and Trademark Office in prior Application No. , filed .

Please charge any deficiency or credit any overpayment to Deposit Account No. 23-3050. This form is submitted in duplicate.

English language abstracts have been provided for reference(s) **#2** which are not in the English language.

Date: Aug. 26, 2003

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Form PTO-1449 Modified List of Patent and Publications Cited by Applicant (Use several sheets if necessary) U.S. Department of Commerce Patent and Trademark Office	Docket No. **GKN-0135**	Application No. **10/624,616**
	Applicant **Zi Li, et al.**	
	Filing Date **July 21, 2003**	Group **Not Yet Assigned**

U. S. PATENT DOCUMENTS

Examiner Initial		Document No.	Date	Name	Class	Subclass
	1	5,342,431	08/30/94	Anderson, et al.	95	45

FOREIGN PATENT DOCUMENTS

Examiner Initial		Document No.	Date	Country	Translation YES	Translation NO
	2	DE 689 04 597	01/27/93	Germany	X(Abstract)	
	3	EP 0 344 961 A1	12/06/89	EPO		
	4	EP 0 381 812 A1	08/16/90	EPO		
	5	EP 0 426 546 A2	05/08/91	EPO		
	6	WO 99/56899	11/11/99	PCT		

EXAMINER	**DATE CONSIDERED**

POWERED BY Dialog

Composite membrane(s) used in ultra-and micro- filtration - have porous metal support carrying film of sintered non-metallic particles

Patent Assignee: NORTH WEST WATER GROUP PLC; CERAMESH LTD; ALCAN INT LTD
Inventors: DAVIDSON A P; THOMAS M P; SUMMERS S W; COWIESON D R; WILLIAMS P J

Patent Family

Patent Number	Kind	Date	Application Number	Kind	Date	Week	Type
EP 344961	A	19891206	EP 89305213	A	19890523	198949	B
AU 8935093	A	19891130				199003	
JP 2035917	A	19900206	JP 89131230	A	19890524	199011	
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Priority Applications (Number Kind Date): GB 8812217 A (19880524)
Cited Patents: CH 663356; EP 144097 ; EP 219383 ; EP 224444 ; EP 242208 ; EP 288380 ; EP 40282 ; FR 2527092; FR 2549736; LU 79631; US 3926799 ; EP 224208

Patent Details

Patent	Kind	Language	Page	Main IPC	Filing Notes
EP 344961	A	E	9		
Designated States (Regional): BE CH DE ES FR GB IT LI NL SE					
US 4935139	A		6		
EP 344961	B1	E	8	B01D-069/12	

Designated States (Regional): BE CH DE ES FR GB IT LI NL SE					
DE 68904597	E			B01D-069/12	Based on patent EP 344961
US 5376442	A		7	B01D-039/08	Cont of application US 89355646
					Cont of application US 92884214
US 5605628	A		16	B01D-063/00	Cont of application US 89355646
					Cont of application US 92884214
					CIP of application US 9337712
					CIP of patent US 5376442
JP 2873293	B2		9	B01D-071/02	Previous Publ. patent JP 2035917
CA 1336872	C			B01D-069/12	
CA 1338853	C			B01D-069/12	

Abstract:
EP 344961 A

Membrane (I) has a porous metal support (II) carrying at least one porous inorganic films(III) of sintered non-metallic particles. (III) is biaxial in compression at ambient temp. and e.g. has a 0.05-10 micron thickness. (III) may be TiO2, Al2O3, SiO2 and/or a refractory metal oxide. (II) is pref. stainless steel. Membranes can be mfd. by application of a sol or suspension onto (II) to form a layer that does not penetrate the pores followed by heating to cause sintering.

USE/ADVANTAGE - (I) are used in sepn. and ultra and micro filtration. Accidental cracking does not propagate in the membrane. (I) are plastically deformable. (II) are cheap compared to ceramic supports. (I) are sterilisable, chemically resistant and useable in the food and chemical industry. (II) can be shaped to create vortices in the fluid being filtered this avoiding blockage.

Dwg.0/0

EP 344961 B

A composite membrane comprising a porous support and at least one porous inorganic film of sintered non-metallic particles carried by the support and overlying a surface thereof, characterised in that the porous support is of metal whereby the film is in biaxial compression at ambient temperature and the membrane is plastically deformable without cracking. (Dwg.0/0)

EP 348041 B

A composite membrane comprising an inorganic support composed of woven or non-woven fibres and having interstices of diameter greater than 5 micro-m and length less than ten times their diameters, and porous inorganic films of sintered non-metallic particles carried by the support and bridging the interstices thereof, the films having pore sizes up to 2 microns. (Dwg.0/0)5

US 5605628 A

A composite membrane comprising an inorganic support composed of woven or non-woven fibres and having interstices of dia. > 5 mu m and length less than ten times their dias., and porous inorganic films

of sintered non-metallic particles carried by the support and bridging the interstices of it, the films having pore sizes up to 2 mu m.

Dwg.1a,1b/

7

US 5376442 A

Composite membrane comprises an inorganic support, pref. a woven, fibrous mesh, with interstices of more than 5 mm. dia. and length less than ten times dia., and porous inorganic films of sintered non-metallic particles bridging the interstices. Films have pore sizes up to 2 microns and are coplanar with the support. Each film being meniscus-shaped with min. thickness in the middle of the interstice about the same or less than support thickness.

USE/ADVANTAGE - Used as filters for slurry sepn. Plastically deformable without loss of performance, not subject to handling abuse.

Dwg.0/0

US 4935139 A

A composite membrane consists of A) a porous metal support, B) a porous inorganic film of sintered non-metallic, pref, alumina, particles on one side of metal support. The film is in biaxial compression at ambient temp. and can be plastically deformed without cracking.

B) is pref. formed by a sol-gel technique, is 0.05-10 microns thick and has a pore size 0.5nm to 5 microns which is always smaller than the 1-10 micron pore size of the support.

ADVANTAGE - any accidental cracks do not propagate or cause catastrophic failure of the membrane as filter.